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09/384,141	08/27/1999	IKKO FUSHIKI	03797.81834	7425

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EXAMINER	
LAROSE, COLIN M	
ART UNIT	PAPER NUMBER
2623	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/384,141	FUSHIKI ET AL.	
	Examiner	Art Unit	
	Colin M. LaRose	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 July 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,6-23,57 and 60-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,6-23,57 and 60-62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Arguments and Amendments

1. Applicants' arguments and amendments (Paper 21) filed 14 July 2003, have been entered and made of record.

Response to Amendments and Arguments

2. Applicant has amended independent claims 1, 15, 23, and 57 to denote that the gamut expanded sRGB color space values are "linear with respect to luminance". Similar language appears in amended claim 60 and new claims 61 and 62.

Applicant asserts (page 16, paper 21, paragraph 1) that Pritchett "assumes a perceptually linear color space, i.e., a color space with a gamma correction of 2.2 included" and that Stokes' color space "by definition, is a *perceptual*-based color space" (emphasis added). Also, Applicant states that "color spaces that are 'linear with respect to *brightness*' are color spaces that utilize perceptual-based values" (emphasis added).

Then, Applicant asserts that the present invention distinguishes over Pritchett and Stokes because the present invention "describes a conversion utilizing a *physical*-based color space, i.e., a space with a gamma correction of 1.0... Color spaces that are 'linear with respect to *luminance*' are color spaces that utilize physical-based values" (emphasis added).

Thus, Applicant essentially argues that Pritchett's gamut expanded color space values are linear with respect to brightness, whereas the gamut expanded color space values of the present invention are linear with respect to luminance.

3. Applicant cites page 7, line 16 through page 8, line 3 and page 8, lines 18-21 of the Specification as "describing some of the differences between physical- and perceptual-based color spaces". However, the cited passages do not appear to describe such a difference. Instead, the passages appear to describe how to eliminate the "non-linearity requirement" of sRGB by extending the size of each component. No comparison between physical- and perceptual-based color spaces is presented therein.

The Specification does not appear to address the distinction between a color space being "linear with respect to brightness" vs. being "linear with respect to luminance". Also, the Specification does not appear to disclose or suggest that that the present invention's gamut expanded sRGB (XsRGB) color data values are of a physical-based color space and thus are linear with respect to luminance. Rather, the Specification states that "XsRGB is linear in the *visual* intensity of each component" (page 8, line 18), which suggests that XsRGB is "linear with respect to brightness" as in perceptual-based (i.e. visual) color spaces (emphasis added).

4. It should be noted that the Specification does not describe the differences between the terms "luminance" and "brightness". Although there are recognized differences between the two terms, they are commonly used interchangeably by those skilled in the art. Furthermore, the Specification states that "XsRGB is linear in visual *intensity*" and not "linear with respect to *luminance*", as claimed (emphasis added). The Specification does not define or otherwise address the differences and/or similarities among the terms "intensity", "luminance", and "brightness".

5. The Specification states that "when the size of each component [of sRGB] is extended to higher bit (12 bit or higher), the non-linearity requirement is eliminated" (page 8, lines 6-7), and the resulting expanded color space, XsRGB, is "linear in the visual intensity of each component" (line 18). Thus, it can be concluded that extending the number of bits of the sRGB values to 12 or more inherently produces an expanded color space that is "linear in visual intensity".

Pritchett discloses the same concept, whereby the number of bits of each component is increased to 13 bits (column 6, lines 18-22). Therefore, Pritchett's gamut expanded color space is also "linear in visual intensity".

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1, 4, 6-23, 57, and 60-62 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claims 1, 15 23, 57, and 60-62, the Specification states that the gamut expanded sRGB color data values are linear in "visual intensity", but does not describe or explain how or why said values are linear with respect to "luminance".

For examination purposes, intensity and luminance are interpreted to be essentially synonymous in that they both denote the lightness or darkness of pixels or groups of pixels in an image.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 1, 4, 6-23, 57, and 60-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pritchett and "A Standard Default Color Space for the Internet – sRGB" by Stokes et al. ("Stokes 2").

Regarding claim 1, Pritchett discloses a method for providing a color space representation of color images in a color management system, comprising the steps of:

mapping YCC color data values representing an image in a first device into gamut expanded RGB color values of a gamut expanded RGB color space (710, figure 7: inputted YCC of a video camera is converted to gamut expanded RGB);

converting the gamut expanded RGB color data values of the gamut expanded RGB color space into RGB color data values representing an image in a second device (730, figure 7: the gamut expanded RGB is converted to RGB format), the color data values of the first device being different from the RGB color data values of the second device (i.e. RGB is not the same as YCC) and the physical appearance of the image in the first device being the same as the physical appearance of the image in the second device (column 2, lines 34-39: the quality of the original image, with respect to the viewer, is preserved after conversion without information loss);

wherein the gamut expanded RGB color data values are linear with respect to luminance (as explained above in paragraphs 4 and 5, Pritchett's gamut expanded RGB is linear with respect to intensity, which is broadly interpreted as being essentially the same as luminance).

Pritchett demonstrates the YCC-RGB conversion because it is an extreme case among color space conversions and is a useful and common conversion. Pritchett teaches that his invention relates to converting images between two devices and is not limited to the specific example of YCC-RGB conversion (column 3, lines 44-59).

Stokes 2 teaches that the variations in physical appearance of an image displayed on different RGB devices, such as monitors, is a well-known problem, and discloses the standard RGB color space in order to improve color fidelity among different devices. Thus, one skilled in the art would have been motivated to utilize Pritchett's system for an RGB-RGB conversion between two devices that each process images in RGB with a reasonable expectation of success.

Pritchett does not disclose or suggest an RGB-RGB conversion by utilizing an intermediate expanded sRGB color space. However, as shown by Stokes 2, the color space sRGB is a known standard color space used in color management applications for color space conversion. It would have been obvious to one skilled in the art to replace RGB with the well-known standard RGB.

Claims 15, 23, 57, and 60 recite similar features substantially within the scope of claim 1 and are rejected in accordance with claim 1.

Further regarding claims 15 and 23, Pritchett teaches the expanded RGB includes values beyond a reproduction range and includes a precision and range sufficient to include all colors in a humanly visible gamut (column 6, lines 18-22).

Further regarding claim 60, Pritchett discloses at least one of super transparent and super opaque colors using an alpha channel for at least one of transparency information and opaqueness information (elements 460 and 470, figure 4).

Regarding claim 4, Pritchett discloses clipping extended RGB values to RGB values (column 8, lines 25-30).

Regarding claim 6, the Applicant's specification states, "when the size of each component is extended to higher bit (12 bit or higher), the non-linearity requirement is eliminated" (page 8, lines 6-7). Pritchett discloses extending the size of each component to 13 bits (column 6, lines 18-22) and, as a result, the extended RGB color space is inherently linear in visual intensity, in accordance with Applicant's disclosure.

Regarding claims 7 and 16, the combination of Pritchett and Stokes discloses the gamut expanded sRGB color space (i.e. "an XsRGB") includes at least the visible range of color values (Pritchett, column 6, lines 15-22) and extends into negative component values and beyond 1.0 when normalized to 1.0 in RGB (column 5, lines 1-4 and column 6, lines 18-22), is defined by a gamut that extends beyond normalized values (column 5, lines 1-4 and column 6, lines 18-22), and may include an alpha channel for at least one of transparency information and opaqueness information (Prichett, column 7, lines 3-15).

Regarding claim 8, Pritchett teaches the expanded RGB color space extending beyond the range of [0, 1.0] when normalized to 1.0 in RGB (column 5, lines 1-4 and column 6, lines 18-22).

Regarding claims 9 and 17, Pritchett includes the step of multiplying normalized RGB values by a predetermined matrix in mapping to an extended RGB color space (column 6, lines 53-58).

Regarding claims 10 and 18, Stokes discloses this conversion on page 10.

Regarding claims 11 and 19, Pritchett discloses representing the extended RGB with 13 bits to cover the extended RBG range of (-4, 4). Ten bits are used for fractional portions, two bits for integer portions, and one sign bit (column 6, lines 18-22).

One of ordinary skill in the art recognizes the advantage of using a large number of bits to represent digital image data. Therefore, Pritchett's representation of color data value using 13 bits (rather than 16 or 17 or 18, etc.) is a design choice. Applicant's specification states "... in one embodiment, color data values may be expressed in a signed 16-bit integer..." This suggests that the choice of 16 bits to represent extended RGB data is not an inventive step and is merely a design choice.

Regarding claims 12 and 20, techniques for converting normalized color data to 16-bit color data by the multiplication of a scalar were well known to those of ordinary skill in the art at the time of the invention. This claim is necessitated by the choice of representing color data in 16 bits and does not present any inventive steps.

Regarding claims 13 and 21, Pritchett discloses clipping extended RGB values to RGB values (column 8, lines 25-30). In Pritchett's embodiment, RGB data is represented by ten bits (column 5, lines 6-9), and extended RGB data is represented by 13 bits (column 6, lines 18-22), so clamping involves transforming color space data from 13 to 10 bits.

As stated above, Pritchett's representation of extended RGB with 13 bits is a design choice. Similarly, the representation of RGB data in ten bits is also a design choice. Therefore, choosing to clip 16-bit data to 8-bit data rather than 13-bit data to 10-bit data is a design choice, and no inventive steps are taken.

Regarding claims 14 and 22, Pritchett's teachings include the case wherein color data values are one of non-premultiplied color data values and premultiplied color data values. It is noted that this limitation covers all cases.

Regarding claims 61 and 62, Pritchett discloses method/computer-readable medium for:

mapping color data values representing an image in a first device into color data values of an XRGB (i.e. an extended RGB) color space (710, figure 7: inputted YCC of a video camera is converted to gamut expanded RGB); and

converting the XRGB color data values into color data values representing an image in a second device (730, figure 7: the gamut expanded RGB is converted to RGB format),

wherein the XRGB color data values are linear with respect to luminance (as explained above in paragraphs 4 and 5, Pritchett's gamut expanded RGB is linear with respect to intensity, which is broadly interpreted as being essentially the same as luminance).

Pritchett's second device is "computer equipment" that utilizes an RGB (as opposed to sRGB) color space (column 4, lines 33-35), and thus Pritchett does not disclose or suggest the conversion into data values of an XsRGB color space.

Stokes 2 teaches that the variations in physical appearance of an image displayed on different RGB devices, such as monitors, is a well-known problem, and discloses the standard RGB (sRGB) color space in order to improve color fidelity among different devices. In view of Stokes 2's teachings that the sRGB color space is preferred to RGB, one skilled in the art would have been motivated to utilize sRGB for devices that previously employed RGB. Thus, it would have been obvious to employ sRGB rather than RGB in Pritchett's "computer equipment" that normally employs RGB.

Pritchett discloses that the extended color space corresponds to the color space utilized by the second device (column 5, lines 57-61). Therefore, in view of the above replacement of RGB with sRGB in Pritchett's second device, the extended color space corresponds to sRGB (i.e. it is an XsRGB color space).

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colin M. LaRose whose telephone number is (703) 306-3489. The examiner can normally be reached Monday through Thursday from 8:00 to 5:30. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au, can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2600 Customer Service Office whose telephone number is (703) 306-0377.

CML
Group Art Unit 2623
4 August 2003

AMELIA M. AU
SUPERVISORY PATENT EXAMINER
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